

INTELLIGENT  
CHARGING  
STATION

**ICS-200**

## *ICS-200 User's Guide*



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## IMPORTANT SAFETY INSTRUCTIONS

Carefully read these instructions and the charging instructions in your vehicle owner's handbook before charging your electric vehicle.

The following symbols may be found in your handbook or on labels affixed to your conductive charge station:

**Note** *This means pay attention.* Notes contain helpful suggestions.



**Caution** *This symbol means be careful.* You are capable of doing something that might result in damage to equipment.



**Warning** *This symbol means danger.* You are in a situation that could cause bodily injury. Before you work on any electrical equipment, be aware of the hazards involved with electrical circuitry and standard practices for preventing accidents.

### Safety Guidelines

- Only use this charge station to charge electric vehicles equipped with a conductive charge port inlet. See the vehicle's owner's handbook to determine if the vehicle is equipped with a conductive charge port inlet.
- When removing the charge station's connector from the vehicle's charge port inlet, release the locking mechanism and pull the connector out.
- Make certain the charge station's supply cable is positioned so it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- Do not attempt to repair or service your conductive charge station yourself. There are no user serviceable parts inside. Refer to the Customer Support section in this manual for service information.
- Do not operate your charge station with a visibly damaged supply cable or charge station. Contact your customer support representative for service immediately. Refer to the Customer Support section in this manual for service information.
- Do not operate your charge station if it has received a sharp blow or been dropped or otherwise damaged in any way. Refer to the Customer Support section in this manual for service information.



**Warning** Turn off input power to your charge station at the circuit breaker panel before servicing or cleaning the unit. Refer to the "Maintenance" section of your handbook for additional information.

- **VENTILATION** - Some electric vehicles require an external ventilation system to prevent the accumulation of hazardous or explosive gases when charging indoors. Check the vehicle's owner's handbook to determine if your vehicle requires ventilation during indoor charging.

**Note** When installed in an enclosed area, this charge station will not charge vehicles that require ventilation if the ventilation system has not been installed and properly connected to the charge station or if the ventilation system has failed.

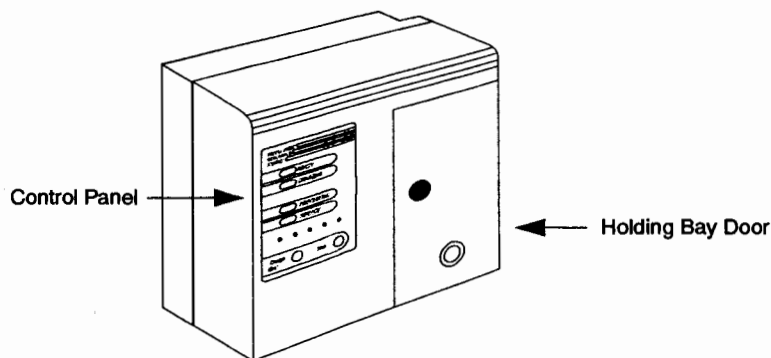


**Caution** Do not attempt to defeat the ventilation system control mechanisms. If a malfunction of the ventilation system is suspected, **DO NOT** charge your vehicle if it requires ventilation indoors. Contact your EVI sales and service representative for service information immediately.

## OVERVIEW

The ICS-200 is a conductive charge station that provides the electric vehicle (EV) user with a safe and manageable link between the power grid and the onboard charger of an EV. The ICS-200 works in conjunction with your EV's onboard charger to provide automatic and unattended charging. Refer to your EV Owner's handbook for charging time and additional information.

**Figure 1. The ICS-200 Charging Station**



## Features

The following standard and optional features are supported by the ICS-200.

### Standard Features

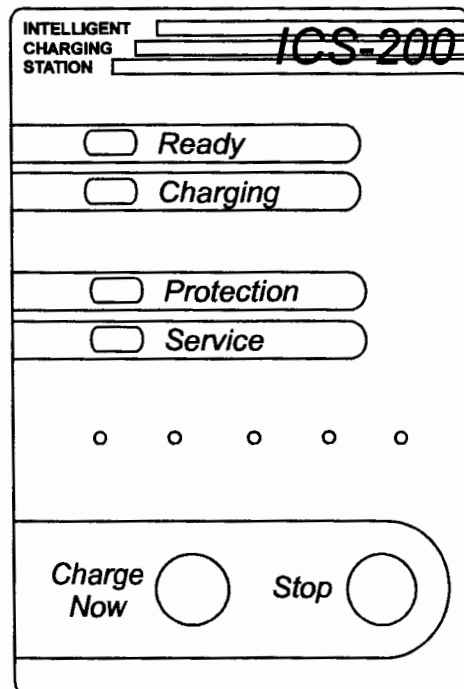
- SAE J-1772 Compliant
- Voice Announcer: User friendly voice-directed operations.
- UL 2231 Personal Protection System: Ground fault protection with automatic re-closure, no manual resetting or testing. (patent pending).
- Cold Load Pickup: Time delayed and randomized (2 to 12 minutes) re-energizing of charging station following power outage.
- Exhaust Fan Controls: Energizing exhaust fan when vehicle requires it.
- Pre-Conditioning: Thermal regulation of battery pack and cabin conditioning without charging batteries.
- Historical collection of data i.e.: counting contactor closures, logging recent errors, and power information.

- **Ground Monitoring Circuit:** Constantly checking for presence of proper safety ground.
- **Contactor Monitoring Circuit:** Constant checking for voltage and failure.
- **Field Installation & Configuration System:** ("FICS") Service installation software interface for re-programmability. PC adapter hardware is not included and must be purchased separately.
- **Hardware Expansion Capability:** To add future needs in a changing market such as UL 2293 Data Communications.
- **Excessive Cable Strain Detection:** On detection of excessive pressure on connector cable the ICS-200 issues a warning and de-energizes the cable.
- **Pull-Free Cabling Systems:** Safely releases cable from charging station when subjected to sufficient force, such as being pulled by a moving vehicle.

## Control Panel

The ICS-200 control panel contains four LEDs (Ready, Charging, Protection, Service) and two push buttons (Charge Now, Stop). (see Figure 2.)

Figure 2. ICS-200 Control Panel



The ICS-200 indicators are described in Table 1.

**Table 1. ICS-200 Indicators**

<b>Indicator Status</b>	<b>Condition</b>
All LEDs - ON	Charge station self-test and system initialization in progress.
Charging, Protection, Service - ON, Ready - BLINKING	Cold-load pickup in progress. See pages 9-10
All LEDs - OFF	No EV connected to charge station or no power.
Ready (amber) - ON	An EV is connected and ready to charge.
Charging (green) - ON	An EV is connected and charging in economy or auto-start mode. See page 9.
Charging (green) - BLINKING	An EV is connected and charging in demand charging mode.
Ready (amber) and Charging (green) - ON	Vehicle requested interruption of charging cycle. Exception - Toyota configured unit?
Protection (red) - ON	An unsafe condition has been detected. *
Service (red) - ON	A fault condition has been detected. *
*Refer to the Troubleshooting section of this manual for more information.	

### Verbal Announcer

The Verbal Announcer's voice messages provide more detailed information on the operation and status of the ICS-200 than that available from the control panel indicators. The volume of the verbal announcer can be set via the control panel.

### EV Connector and Cable

The EV Connector installed in your charging station provides the electrical connection between the charging station and your EV. Several different EV connectors are available for the ICS-200. The type of EV connector can be easily changed on-site by your EVI authorized service representative.

When not in use, the EV Connector is stored in a holding bay behind a locked access door located on the front of the charging station.

### **Cable Tension Detector**

In order to meet the requirements of the NEC article 625-19, the ICS-200 is equipped with an EV cable tension detection mechanism. Pulling aggressively on the EV cable will result in de-energization of the EV cable, the protection designator will be lit, and the announcer will say, "please reduce cable tension." If this occurs, simply reduce pressure on the cable. The EV cable will re-energize if a charging cycle is in process, and the ICS-200 will resume normal operation.

### **EV Cable Pull-Free Protective Mechanism**

It is important not to pull too hard on the EV cable. The ICS-200 is equipped with a pull-free system which allows the EV cable to come out of the unit under conditions which may cause damage to the EV or the ICS-200. In the unlikely circumstance this protective measure occurs, call an authorized electrician to reinstall the EV cable. It is very likely that no damage will have occurred to the ICS-200.

### **External Ventilation Control**

The majority of OEM electric vehicles do not require extended ventilation, but some older vehicles and conversion electric vehicles require ventilation to prevent the accumulation of hazardous gases when charging indoors. Check your EV's owner's manual to determine if your vehicle requires ventilation while charging. If ventilation is required, a ventilation system must be installed to the charging area by a qualified electrician in accordance with the 1996 National Electric Code ANSI/NFPA 70. (Article 625,715)

When properly connected to an external ventilation system, your charge station will automatically turn the ventilation system on and off as required during charging. Contact your customer service representative for information on installing an external ventilation fan.



**Caution** Connection of your charge station to an external ventilation system should only be performed by a qualified electrician. It is recommended that the ventilation system be connected during installation of your charge station.

**Note** If your vehicle requires ventilation during charging, and no ventilation has been provided, your charge station will not operate and the announcer will give a fan failure message.



**Warning** Do not attempt to defeat your charge station's ventilation controls as this may lead to a hazardous or explosive gas buildup during charging. If a malfunction of the external ventilation system is suspected, do not charge vehicles that require ventilation. Contact a qualified electrician for immediate service of the ventilation system.

## Software Programmable Configuration

Nearly all functions of the ICS-200 are software configurable parameters which can be upgraded in the field. Consult your customer service representative for more information on configuring the basic functions of the ICS-200.

## Software Upgrading

The basic software of the ICS-200 can be upgraded in the field. Contact your customer service representative for information on upgrades.

## OPERATION

This section describes the ICS-200 charging procedures and control panel configuration procedures.

**Note** Refer to the charging instructions in the vehicle owner's handbook for your vehicle's specific charging information.

The ICS-200 is able to perform three types of charging: economy charging, demand charging, and auto-start charging. Each type of charging is described below, along with instructions for connecting and disconnecting the charging station from an EV.

**Note** Do not connect the charging station to an EV if no charging is desired.

**Note** If a fault is detected during charging, your charge station will automatically stop charging and the announcer will give the appropriate fault message. (Refer to the "Troubleshooting" section if this occurs.)

## Auto-Start Charging

The ICS-200 can be configured for Auto-Start Charging. Auto-Start Charging automatically initiates charging immediately after plugging the EV connector into the EV.

Use this procedure to initiate Auto-Start Charging:

1. Remove the EV connector from the ICS-200's holding bay.
2. Insert the plug into the EV's charge port inlet. The ICS-200 will immediately perform internal diagnostics. After a few seconds, the amber Ready indicator will light. The ICS-200 announces "full charge," then starts charging. The green Charging indicator lights.

**Note** Auto-Start Charging can be terminated by pressing the Stop button, or removing the connector from the EV.

## Economy Charging

If time-of-use metering is installed on the EV circuit, the ICS-200 can be configured to charge only when the power rates are at their lowest. When so configured, the ICS-200 always has Economy Charging mode enabled. Economy Charging requires no action, other than plugging in the EV. The announcer will normally not speak during Economy Charging except immediately after the EV is plugged in.

Use this procedure to initiate Economy Charging:

1. Remove the EV connector from the ICS-200's holding bay.
2. Insert the plug into the EV's charge port inlet. The ICS-200 will immediately perform internal diagnostics. After a few seconds, the amber Ready indicator will light. The ICS-200 is ready to begin charging.
3. The announcer says:
  - Day of the week.
  - Current time.
  - Time it will begin economy charging.
4. When the economy charging time has been reached, the green Charging indicator lights. The ICS-200 begins charging.
5. When the EV has finished charging, or if the EV is not requesting a charge, the amber Ready indicator is lit and the green Charging indicator is off.

## Demand Charging

If the ICS-200 is configured for Economy Charging, you can use Demand Charging to override the station's preconfigured Economy Charging settings.

Use this procedure to initiate Demand Charging:

1. Remove the EV connector from the ICS-200 holding bay.
2. Insert the plug into the EV's charge port inlet. The ICS-200 will immediately perform internal diagnostics. After a few seconds, the amber Ready indicator will light. The ICS-200 is ready to begin charging.
3. The ICS-200 announces:
  - The day of the week.
  - The current time.
  - The time it will begin economy charging.
4. Press the Charge Now button to begin Demand Charging. The announcer will say the number of charging hours.
5. Press the Charge Now button again to move through the preconfigured charge durations.

**Note** You can press and hold the Charge Now button to move through the charge periods quickly.

**Note** A full-charge demand cycle can only be terminated by pressing the Stop button or removing the connector from the EV.

6. During Demand Charging the green Charging indicator may blink as a reminder that higher electrical rates are in currently effect, depending on the configuration of the ICS-200.
7. When the vehicle has finished charging, or if it is not requesting a charge, the amber Ready indicator lights and the green Charging indicator is off.

## Stopping the Charge Cycle

The charging cycle can be discontinued at any time by pressing the Stop button. Charging will also be discontinued automatically if the EV connector is unplugged from the EV.

Use this procedure to stop a charging cycle:

1. Press the Stop button. The current charging cycle stops and all control panel lights go off. Depending on the configuration of the ICS-200, the announcer may say the number of hours that power has been applied.
2. Unplug the EV and replace the connector into the holding bay. No designator will be lit.

**Note** EVI recommends that you always push the Stop button before removing the EV connector from a vehicle to extend the life of the connector.

**Note** Your ICS-200 may be configured to require the vehicle connection be broken and then reestablished whenever the user has stopped the charging process by pushing the Stop button. If this option is disabled, the system will automatically re-enable charging after a few minutes.

## Charging Cycle Information

Your ICS-200 may be configured to store the amount of time station power was applied during the previous charge cycle. The information is reset at the beginning of each charging cycle. If the EV remains plugged in for multiple charging periods, the total time power was applied will be accumulated. The charging station announces the number of power-applied hours whenever the EV connector is pulled from a vehicle charge port.

The ICS-200 accumulates the total kilowatt-hours used for charging. This information may be part of the charge-cycle information announcement, depending on the station's configuration.

The ICS-200 determines the time power was applied based on the amount of current drawn by the EV's charger. Whenever the EV draws more than a minimum amount of current, the ICS-200 accumulates charge time.

## Repeating the Last Charge Information

The ICS-200 stores the number of power applied hours accumulated during the last charging cycle. The ICS-200 will remember the number of hours charged until a new charging cycle is started by connecting the charging station to an EV.

To repeat the last charge information, make sure the ICS-200 not connected to an EV then press and release the Stop button. The announcer will say the number of power applied hours during the last charging cycle. If configured to do so, it will also announce the total number of kilowatt-hours.

## Setting the Sound Volume

Use the following steps to change the verbal announcer sound volume:

1. Make sure the ICS-200 not connected to an EV
2. Press and hold the Stop button for 5 seconds. When the announcer says "set volume," release the Stop button.
3. Press the Charge Now button until the desired volume is heard.

**Note** You can press and hold the Charge Now button to cycle through the different volumes quickly.

4. Press the Stop button to set the desired volume.

**Note** The announcer's volume may be set to off, or volume turned completely down.

5. The announcer will say, "set time, *current hour*."
6. Press the Stop button several times to cycle through the time and date functions.

**Note** The volume you select may not take affect until the time and date functions are complete.

## Setting the Time and Date

Use the following steps to set the ICS-200 date and time:

1. Make sure the ICS-200 not connected to an EV.
2. Press and hold the Stop button for 5 seconds. The announcer will say "set volume". Release the Stop button.
3. Press the Charge Now button until the desired volume is heard.

**Note** You can press the Stop button to cancel setting the volume and go directly to setting the time, or you can press and hold the Charge Now button to cycle through the different volumes quickly.

4. Press the Stop button to set the desired volume. The announcer's volume may be set to zero.

**Note** The ICS-200 will always set the volume to at least a minimum level during the time and date configuration process.

5. The announcer will say, "set time, *current hour*".
6. Press the Charge Now button to cycle through the hours of the day.

**Note** You can press the Stop button to cancel setting the hour and go directly to set the minutes, or you can press and hold the Charge Now button to cycle through the hours of the day quickly.

7. When the desired hour is heard, press the Stop button.
8. The announcer will say, *current minutes*, indicating the number of minutes.
9. Press the Charge Now button to cycle through the minutes.

**Note** You can press the Stop button to cancel setting the minutes, or you can press and hold the Charge Now button to cycle through the minutes quickly.

10. When the desired minute is heard, press the Stop button.

11. The announcer will say, month *NN*, indicating the current month.
12. Press the Charge Now button to cycle through the months.  
**Note** You can press the Stop button to cancel setting the month, or you can press and hold the Charge Now button to cycle through the months quickly.
13. When the desired month is heard, press the Stop button.
14. The announcer will say "day *NN*," indicating the current day.
15. Press the Charge Now button to cycle through the days.  
**Note** You can press the Stop button to cancel setting the day, or you can press and hold the Charge Now button to cycle through the days quickly.
16. When the desired day is heard, press the Stop button.
17. The announcer will say "year *NNNN*," indicating the current year.
18. Press the Charge Now button to cycle through the years.  
**Note** You can press the Stop button to cancel setting the year, or you can press and hold the Charge Now button to cycle through the years quickly.
19. When the desired year is heard, press the Stop button.
20. At this point the internal clock is updated and the announcer says the new time and date.
21. Volume level returns to user configured setting.

## MAINTENANCE

The ICS-200 requires no maintenance other than occasional cleaning.



**Warning** To reduce the risk of electrical shock or equipment damage, do not allow liquid to enter the unit while cleaning it.

1. Turn off your charge station at the circuit breaker before cleaning.
2. Clean your charge station using a soft cloth lightly moistened with mild detergent solution. Never use any type of abrasive pad, scouring powder, or flammable or non-flammable solvent such as alcohol or benzene.

## TROUBLESHOOTING

The ICS-200 is capable of detecting a wide range of unsafe conditions and fault conditions. If there are problems with your ICS-200, use this section to help identify the cause.

**Note** Please contact your customer service representative if you have any questions regarding service for the ICS-200.

### Troubleshooting Unsafe Conditions

When the ICS-200 detects an unsafe condition, this usually means the built-in protection circuitry of the charging station has been activated. In many cases these conditions are automatically resolved by the charging station. In other cases you may be able to quickly resolve the problem by following the steps provided below.



**Caution** If you are unable to resolve the condition on your own, or have any questions about the action required, please call your customer service representative.

Common unsafe conditions are listed below in Table 2 and described in the paragraphs that follow.

**Table 2. List of Unsafe Conditions and Messages**

Indicator	Status	Voice Message	Problem
Protection	Blinking*	None	Ground fault
Protection	Static	Ground fault error since <i>time</i>	Ground fault
Protection	Static	Please reduce cable tension	EV cable tension
Protection	Static	Fan failure since <i>time</i>	Venting fan failure
Protection	Static	Electric vehicle connection fault since <i>time</i>	Electric vehicle connection fault
Protection	Static	Announcement of incorrect time or date.	Internal clock corrupted or not set

\*Initially blinks during reclosure attempts, then remains static based on GA power experience.

### **Condition - Ground Fault Error or Electric Vehicle Connection Fault**

The ground fault system automatically attempts recovery whenever a ground fault is detected. The Protection indicator blinks during the recovery attempt. If the charging station is unable to recover from the error, the station will give the appropriate error message and the Protection indicator will cease blinking.

An electric vehicle connection fault can be caused by a dirty or improperly inserted EV connector, or may be caused by equipment failure.

If a ground fault error or an EV connection error has been detected:

1. Remove the EV connector from the vehicle
2. Inspect the connector. Make sure the connector is clean and dry.
3. Refer to the vehicle owner's manual for instructions on inspecting and cleaning the charge port.
4. Plug the EV connector back into the vehicle.
5. Press the Charge Now button. If the ground fault error is still detected, contact your customer service representative for assistance.

### **Condition - EV Cable Tension**

Refer to the information on Cable Tension in the Operation section of this manual for more information on cable tension.

1. Check the cable for the source of tension. Either something is pulling on the cable, something is weighing the cable down, or the vehicle charge port is too far away from the charging station.
2. Take the appropriate action to release cable tension.

### **Condition - Venting Fan Failure**

If a ventilation fan is required but not operating properly, the charging station will not allow charging.

1. Check that the fan blades are not obstructed, that the fan is plugged in, and that the fan's circuit breaker has not tripped.
2. If there is a problem with the fan or with power to the fan, call a qualified electrician for repairs.

### **Condition - Internal Time Clock Corrupted or Not Set**

The ICS-200 internal time clock should be set to the correct time for proper operation. Refer to the Operations section of this manual for instructions.

**Note** The ICS-200 will allow charging to occur even with a corrupted or incorrectly set clock.

## Troubleshooting Fault Conditions

Fault conditions indicate a failure in the charging station and usually require the intervention of trained EVI service technicians. You can facilitate correction of your ICS-200 by following these steps before calling for service.

Refer to Table 3 to locate the fault condition, then follow the steps below.

**Table 3. List of Fault Conditions and Messages**

Indicator	Status	Voice Message	Problem
Service	Static	Ground not connected since <i>time</i>	No service ground
Service	Static	System failure 000 since <i>time</i>	Contactors open
Service	Static	System failure 001 since <i>time</i>	Contactors closed
Service	Static	System failure 002 since <i>time</i>	EV cable pulled free
Service	Static	System failure 003 since <i>time</i>	Pilot +12V circuitry
Service	Static	System failure 004 since <i>time</i>	Pilot -12V circuitry
Service	Static	System failure 005 since <i>time</i>	Register Configuration error
Service	Static	System failure 006 since <i>time</i>	GFCI circuitry
Service	Static	None	Memory Configuration Error
Any	Any	None	System not responding

### Troubleshooting Procedure for Fault Conditions

You can facilitate correction of fault conditions in your ICS-200 by following these steps before calling for service:

1. Write down the announced fault condition message and note the status of the control panel indicators.
2. Turn off power to the charging station at the circuit breaker.
3. After waiting 10 seconds, turn the power back on.
4. If the condition has been corrected, you may use the ICS-200 for charging.
5. If the fault condition still exists, contact your customer service representative for repairs.
6. Please have the model number and serial number of the unit before calling your customer service representative for repairs. These numbers are located inside of the ICS-200 front door.

## SPECIFICATIONS

### Input Power - Service Entrance

Voltage & Wiring	240 VAC single-phase -L1, L2, Neutral and Safety Ground 208 3-phase, Y-connected - Any 2 phases, Neutral and Ground 208 VAC 3-phase, Delta-connected. With center-tap on one leg, must use only the two phases on either side of the center-tap. The two phases must both measure 120 VAC to Neutral. The neutral must be connected to Safety Ground somewhere in the system on either 3-phase connection.
Current	40 amp, 32 amp continuous typical, 60 amp max, 48 amp continuous optional Main panel circuit breaker: 40 A typical. 60 A max, optional Dependent upon vehicle type
Frequency	60 hz

### Output Power

Power	Variable depending on vehicle (currently vehicles do not exceed 6.6 KW and 32 A current draw)
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### Dimensions

Height	304 mm (12 in)
Width	457 mm (18 in)
Depth	203 mm (8 in)
Charge Connector Cable Length	approximately 6.5 m (20 ft)

<b>Weight</b>	19 kg (42 lb)
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### Environment

Operating Temperature	-30°C (-22°F) / 50°C (+122°F)
Indoor	Yes
Outdoor	Yes
NEMA Rating	Type 4

<b>Agency Approvals</b>	UL Listed, FCC Class B
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<b>Color</b>	Almond texture, powder coat
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<b>Warranty period</b>	3 year labor / 3 years parts
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